

BW
HBW-1
(Chippewas)



BW COMMUNICATIONS CO., inc.

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ROSEMONT, ILLINOIS 60018**

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INSTRUCTION MANUAL

BW Clipper

Model HBW-1

The BW Clipper Model HBW-1 has been designed to operate with HEATH Models SB-100, 101, 102, HW-100, 101 Transceivers and SB-401 Transmitter. This unit is distributed by the HEATH Co. and HEATHKIT ELECTRONIC CENTERS worldwide.

INTRODUCTION

The BW Clipper is a true R. F. processing unit in that it clips the SSB signal in the I. F. of your transmitter. Technical references describing various methods of processing for SSB are:

1. Pappenfus: SSB Principles and Practice, McGraw-Hill
2. Squires & Bedrosian: Computation of SSB Power, IRE Jan. 1960
3. Squires & Clegg: Speech Clipping for SSB, QST July 1964
4. Sabin: R. F. Clipping for SSB, QST July 1967
5. Collins: Ordinary & Processed Speech in SSB, QST Jan. 1969

The article by Sabin is of particular interest as he compares performance between audio clipping, audio compression, r.f. compression, and r.f. clipping. His conclusion is that r.f. clipping is superior to the other methods tested.

Your BW Clipper is an advanced design solid state unit incorporating an integrated circuit for symmetrical hard clipping. The DSB signal from your transmitter is fed to the clipper and filtered thru an identical SSB filter as in your rig to remove the unwanted sideband and attenuate the carrier. It is then amplified, symmetrically hard clipped, and emitter follower matched back to your transmitter. There it is again filtered thru the SSB filter. The clipper is powered from the +230 VDC line in your unit. The voltage is taken from the switched line so the clipper is on only in the transmit mode. The +230 VDC is filtered and regulated to +15 VDC internal to the clipper.

Quantity or DB of clipping is adjusted by the setting of your transmitter gain control and can vary from zero (min. gain) to about 50 DB. The LEVEL control, when set per instructions, prevents over driving your transmitter.

Installation of the BW Clipper is a simple, straight forward process and takes about 30 minutes to complete. It does require some soldering of coax cables to the pick up points in your transmitter I. F.

Installation and adjustment instructions should be followed as carefully as is possible to assure optimum performance.

INSTALLATION INSTRUCTIONS

Follow directions exactly and check each step and workmanship before proceeding to the next step.

1. Remove unit from its housing and set housing aside from work area.
2. Place unit on bench, bottom side up with front panel to you.
3. SEE FIGURE 1. THE FOLLOWING STEPS REFER TO FIGURE 1.
4. Remove "spare B" phono jack from the back panel of the chassis. Save for future replacement. This hole will be the access for the BW Clipper cables.
5. Route all three of the BW Clipper cables thru "spare B" hole.
6. Bring "A" cable in enough to reach the relay socket wiring.
7. Solder center conductor of "A" cable to pin 7 of relay socket. This pin has the Wht-Org-Org wire to it. Take care not to burn other wires.
8. Solder the shield of "A" cable to the ground lug to the right of the relay socket.
9. Bring in the "I" and "O" cables so they reach 3" beyond the front panel of the unit. These cables will route to the Modulator Circuit board.
10. Route the "I" and "O" cables thru the hole in the chassis to the right of the Audio board. This brings the cables to the top side of the chassis. Turn the unit right side up with the front panel facing you.
11. Route the "I" and "O" cables between the relay and final amplifier cage to the front of the unit and to the left of the LMO. Feed the cables down to the board side of the unit thru the chassis cut out for the LMO dial. Keep the cables as far left as possible. Take care so they do not bind on the LMO dial. You may have to stand unit on its side, "S" meter up, to access top and bottom sides for this cable feed.
12. Cut plating with razor blade or X-Acto knife as shown in the detail. This allows insertion of the clipper between the I. F. Isolation Amplifier, V2, and the SSB filter.
13. Unsolder Wht-Vio (ALC) wire from Modulator Circuit board and insulate end. This wire is left open and is not used.
14. Solder a wire jumper from the point where the Wht-Vio wire was connected to ground.
15. Solder the center conductor of the "O" cable to the filter side of the cut plating. SEE DETAIL.
16. Solder one end of the 22uh inductor provided to this same point.
17. Solder the shield of the "O" cable and the other end of the 22uh inductor to the same ground point.
18. Solder the center conductor of the "I" cable to the other side of the cut plating. SEE DETAIL.
19. Solder the shield of the "I" cable to ground.
20. Turn the unit right side up and dress cables neatly. Cable ties are provided to dress cables to your preference.
21. Replace unit in its housing. The installation of the BW Clipper is complete. Proceed to the CALIBRATION and OPERATION section.

CALIBRATION and OPERATION

The BW Clipper has two controls. A two position MODE switch which puts the clipper IN and OUT of the transmitter circuit. The LEVEL control adjusts the peak to peak output level of the clipper to prevent over driving the transmitter circuits.

The setting of the GAIN control on the front panel of your transmitter controls the QUANTITY of R. F. clipping when the BW Clipper is in the IN mode. Excessive advancement of the GAIN control will increase background pickup to undesirable levels.

----- CAUTION -----

Improper adjustment of your equipment, with or without the BW Clipper, can result in shortening of equipment tube life or operation of your linear amplifier beyond legal power input limits prescribed by the F.C.C. In any case, raising the AVERAGE power output with R. F. clipping INCREASES the load on your equipment. Make sure both exciters and linears have proper ventilation. NEVER place anything on top of your equipment to restrict air flow. A SMALL FAN TO CIRCULATE AIR THRU YOUR EXCITER MAY BE A DESIREABLE ADDITION WHEN USING R. F. CLIPPING ON HEAVY DUTY CYCLES AS IN CONTEST OPERATION.

ADJUSTMENT

1. Make sure all cables are properly connected.
2. Set the BW Clipper MODE switch to OUT and the LEVEL control to full counter-clockwise position (min).
3. Turn your transmitter ON and allow time for warm up.
4. Tune your transmitter in accordance with ITS instruction manual and note the setting of the GAIN control, plate current reading, and power output at full output.
5. Switch your transmitter to a listen or standby condition and turn the BW Clipper MODE switch to the IN position.
6. Set the GAIN control on your transmitter to the same position as noted in step 4 above.
7. Key up your transmitter and advance the BW Clipper LEVEL control to a plate current or power output reading just AT or SLIGHTLY BELOW the reading noted in step 4 above. DO NOT HOLD KEY DOWN FOR EXTENDED PERIODS OF TIME.
8. Switch the BW Clipper MODE switch to OUT and talk into the microphone noting the average plate current and power output levels. Switch the MODE switch to IN and do the same. Both power output and plate current readings should increase over the levels noted without clipping. Steps 4 thru 7 should be repeated on each band making a note of plate current reading, GAIN setting, and LEVEL setting to allow pre-set of controls when band switching in the future.
9. You are all set to enjoy greater "punch" through the use of your BW Clipper. MAKE SURE YOUR EQUIPMENT IS ALWAYS PROPERLY VENTILATED.

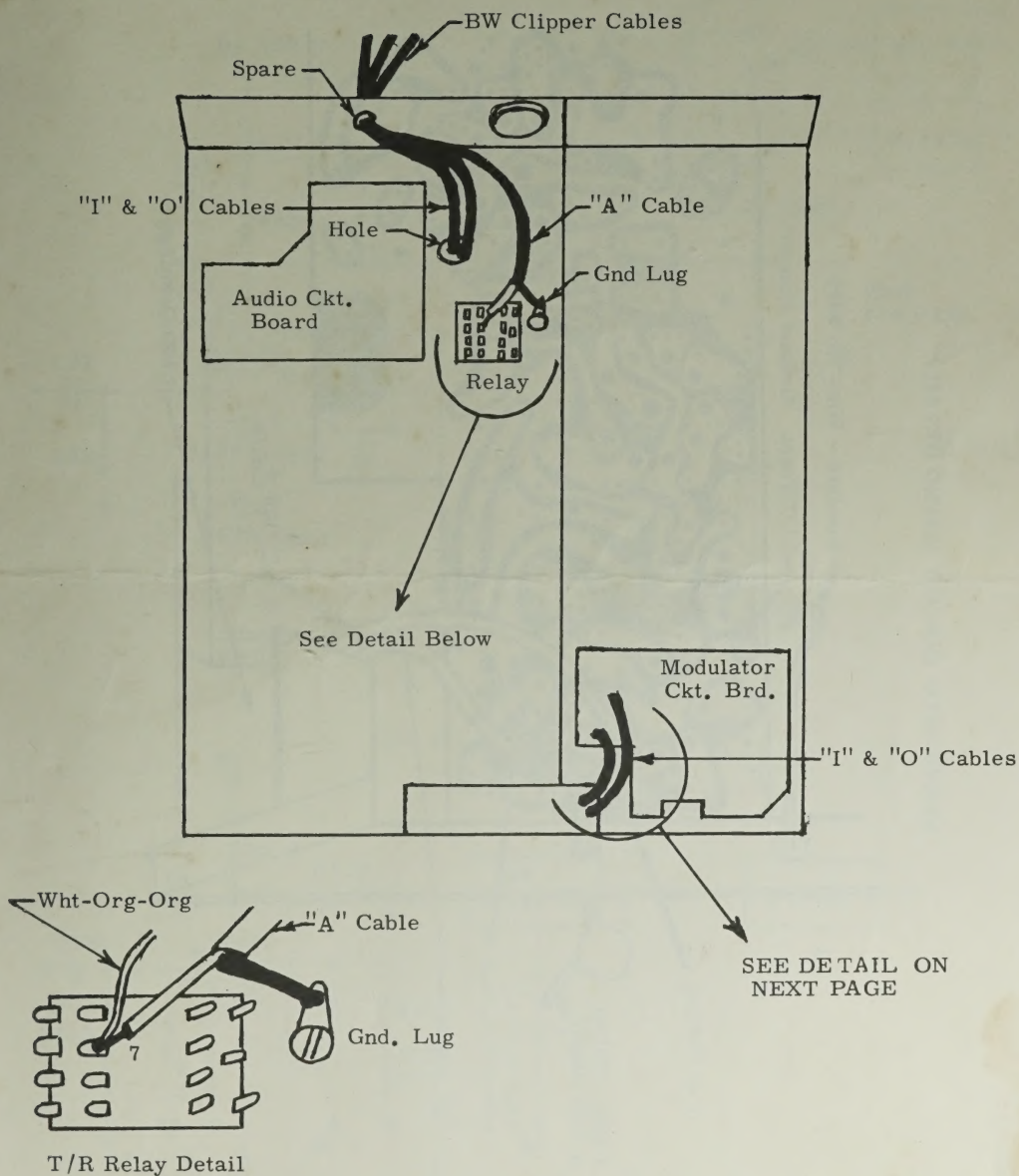
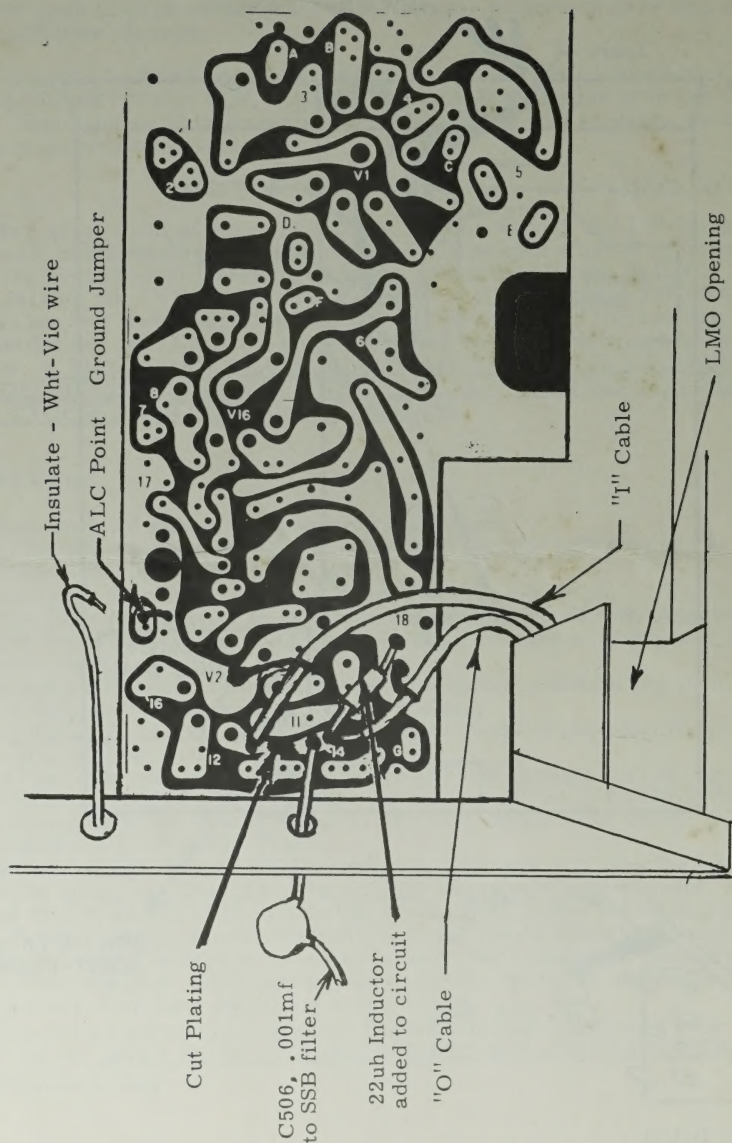
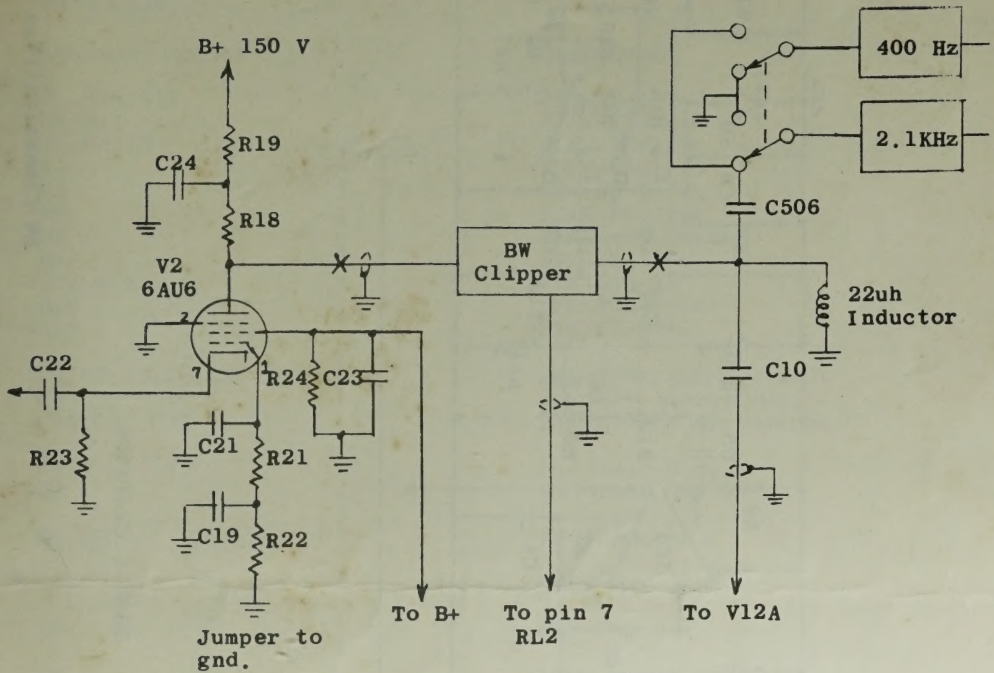


FIGURE 1 -- SB/HW 100, 101, 102 Bottom View

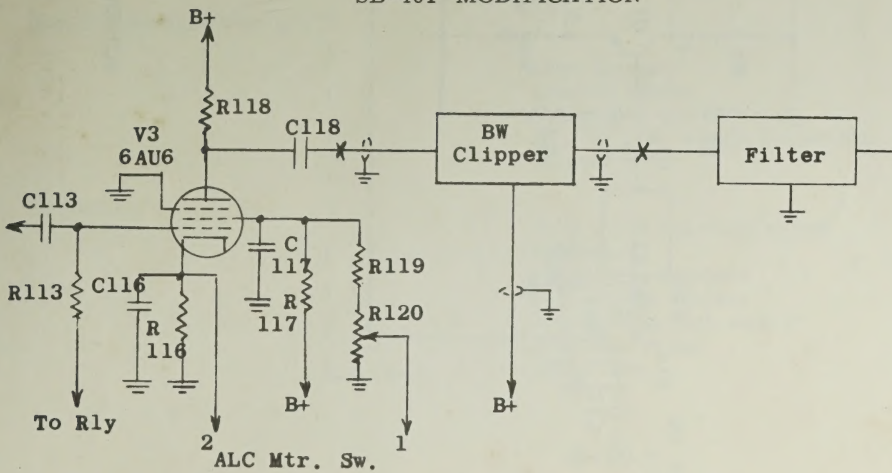
MODULATOR CIRCUIT BOARD DETAIL

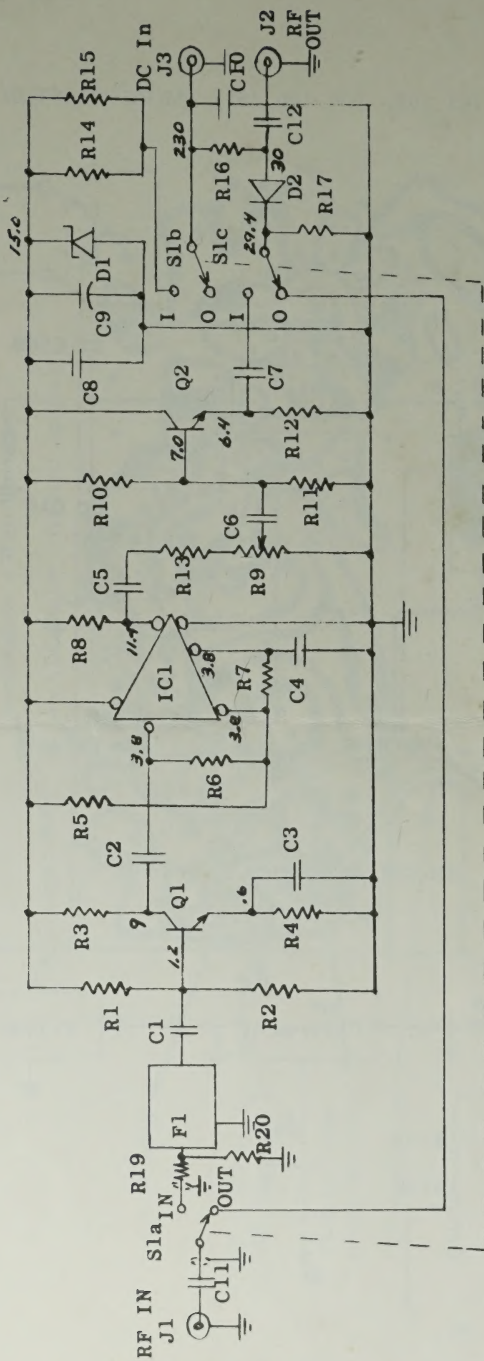


SB-100, 101, 102, HW-100, 101, MODIFICATION



SB-401 MODIFICATION





SCHEMATIC HBW-1 CLIPPER

PARTS LIST

Reference Symbol

Description

R1, R10, R11
R2, R12
R3, R6, R7
R4
R5
R8
R9
R13
R14, R15
R16
R17

22K-5%-1/4w
2.2K-5%-1/4w
8.2K-5%-1/4w
1.0K-5%-1/4w
18K-5%-1/4w
3.9K-5%-1/4w
10K Level Control
39K-5%-1/4w
47K-10%-2w
180K-5%-1/4w
27K-5%-1/4w

C1, C2, C3, C4, C5, C6, C7, C8
C9
C10, C11, C12

.01mf-50v disc. ceramic
25mf-25v electrolytic
.002mf-1kv disc ceramic

D1
D2

15v zener diode
PIN diode, MPN3402

Q1, Q2

NPN transistor

IC1

Integrated Circuit

F1

SSB Filter

S1

Mode switch

J1, J2, J3

Jack, phono

Non-Referenced Parts

22uh Inductor
Control knobs
Cabinet
"I", "O", "A" Cable Assembly
Manual

Hardware

6-32 x 5/8 machine screw
6-32 nuts
6-32 x 1/4 spacers
3/8 control washer
3/8 control lock washer
3/8 control nut
cable ties

SERVICE INFORMATION

Should the BW Clipper fail to provide higher average power levels during SSB operation of your transmitter check the following:

1. Is the Selectivity switch on your transceiver in the SSB position?
2. Are the clipper cables soldered to the correct points in the transmitter?
3. Are the clipper cables in the proper jack terminations on the clipper?
4. Is the clipper in the "I N" mode with LEVEL control turned up past minimum position and transmitter gain control turned up past minimum position?

If all of the above check OK, voltage checks may be made and compared to those on the schematic diagram. Transmitter gain control should be at MIN. while performing these checks. PROCEED WITH CAUTION AS HIGH VOLTAGES ARE PRESENT IN THE TRANSMITTER AND CLIPPER.

*** WARNING ***

Servicing the BW Clipper during the warranty period may void warranty.

Factory service is available from:

BW Communications Co. Inc.
9962 W. Bryn Mawr Ave.
Rosemont, IL 60018
312-671-7401

Warranty service on parts and labor is at no charge. Out of warranty service will be performed at a nominal charge. Call or write for return authorization to BW Communications Co.

REPLACEMENT PARTS ORDER INFORMATION

To order a referenced part from the parts list the order should read:

1	-	HBW-1	-	C9	this specifies C9, the 25mf-25v electrolytic
Quan.		Model No.		Reference On Parts List	

Non-referenced parts should be specified as follows:

1	-	HBW-1	-	"A" Cable Assembly	this specifies the "A" cable assembly
Quan.		Model No.		Parts List Description	

Order parts from:

BW Communications Co. Inc.
9962 W. Bryn Mawr Ave.
Rosemont, IL 60018

Supply complete description AND complete return address. Parts will be shipped via U.P.S. C.O.D. unless prepaid with order.

LIMITED WARRANTY

BW Communications Company warrants to the original purchaser that this product shall be free from defects in material or workmanship for ninety (90) days from the date of original purchase.

During the warranty period the BW Communications Company or an authorized service facility will provide free of charge both parts and labor necessary to correct defects in material and workmanship.

To obtain such warranty service, the original purchaser must:

1. Notify BW Communications Co. as soon as possible after discovery of a possible defect, of:
 - a. The model and serial number, if any;
 - b. Date purchased and HEATH sales document number;
 - c. A detailed description of the problem.
2. Deliver the product to the BW Communications Co., or ship the same in its original container or equivalent, fully insured and shipping charges prepaid. A copy of the HEATH sales document MUST be included with the product.

This warranty does not apply to any defect that BW Communications Company determines is due to:

1. Misuse, abuse, neglect or improper installation.
2. Accidental or intentional damage.
3. Improper maintenance or repair, including modification of the unit.

All implied warranties, if any, terminate ninety (90) days from the date of the original purchase.

The foregoing constitutes BW Communications Company's entire obligation with respect to this product, and the original purchaser and any user or owner shall have no other remedy and no claim for incidental or consequential damages. Some states do not allow limitations on how long an implied warranty lasts or do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation and exclusion may not apply to you.

This warranty gives specific legal rights and you may also have other rights which vary from state to state.

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